

Claims

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Piezoelectric actuator having

a piezoelectric element (2; 21) for actuating a mechanical component with a pulling or pushing force, and a compensating element (3; 22), wherein the piezoelectric element (2) and the compensating element (3; 22) basically have the same temperature expansion coefficients, and wherein the compensating element (3; 22) is mechanically coupled to the piezoelectric element (2; 21) in such a fashion that the temperature-induced expansions of the piezoelectric element (2; 21) and the compensating element (3; 22) cancel each other out in the effective direction in such a fashion that the actuating element remains in its position.

Piezoelectric actuator according to claim 1, characterized in that

a heat transfer compound (12) is located between the piezoelectric element (2; 21) and the compensating element (3; 22).

Piezoelectric actuator according to claim 1 or 2, characterized in that

the piezoelectric element (2; 21) is supported on one end on a fixed support plate (9), which fixed support plate (9) bears against the housing (7) for the piezoelectric actuator (1; 20) via a spring (10) and which is connected at the other end to a pretensioning spring (6; 23) via a pressing plate (11; 24), which pretensioning spring (6; 23), in turn, is held against the fixed support plate (9) with its other end, and that the compensating element (3; 22) basically lies parallel to the piezoelectric element (2; 21) and is also held against the fixed support plate (9) with one end and solidly abuts the housing (7) with the other end.

Piezoelectric actuator according to claim 3, characterized in that

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1 - the pretensioning spring (6) and the piezoelectric element (2) are located
2 in tandem.

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4 5. Piezoelectric actuator according to claim 4, characterized in that
5 - the movable end of the piezoelectric element (2) is connected to the
6 pressing plate (5) via a tightening strap (8).

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8 6. Piezoelectric actuator according to claim 3, characterized in that
9 the pretensioning spring (23) and the piezoelectric element (21) are
10 situated parallel to each other.

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12 7. Piezoelectric actuator according to one of the preceding claims,
13 characterized in that
14 - the pretensioning spring is formed out of at least one zigzag spring (6; 23).

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16 8. Piezoelectric actuator according to one of the preceding claims,
17 characterized in that
18 - the piezoelectric element (2; 21) is composed of a multilayer structure of
19 transversely arranged, ceramic piezoelectric plies that become longer in
20 the effective direction when an external electric voltage is applied, and the
21 compensating element (3; 22) is made of ceramic.

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23 9. Piezoelectric actuator according to one of the claims 1 through 6,
24 characterized in that
25 - the piezoelectric element (2, 21) is composed of a multilayer structure of
26 transversely arranged, ceramic piezoelectric plies that become longer in
27 the effective direction when an external electric voltage is applied, and that
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29 - the compensating element (3; 22) is composed of piezoelectric plies
30 arranged in the longitudinal direction that become shorter in the effective
31 direction when an external electric voltage is applied.

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